DOCUMENT RESUME

ED 194 700 CE 026 299

TITLE	Competencies for Articulation: Auto Mechanics. Tests.
INSTITUTION	Lincoln Public Schools, Nebr.: Southeast Community Coll., Lincoln, Nebr.
SPONS AGENCY	Nebraska State Dept. of Education, Lincoln. Div. of Vocational Education.
PUB DATE	[77]
NOTE	54p.: For related documents see CE 026 298.
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Articulation (Education): *Auto Mechanics: *Competence: Competency Based Education: Criterion Referenced Tests: Secondary Education: Trade and Industrial Education: Two Year Colleges
IDENTIFIERS	Nebraska

ABSTRACT

This booklet of tests is designed to accompany the booklet "Auto Mechanics: Competencies for Articulation"--ED 151 563. The written test questions suggest the knowledge level needed to accomplish the skills necessary to complete the competency. It is suggested that they may be used to assess the development of competencies or they may be used as examples of tests teachers may develop or select. The document is part of a series of guides designed to help articulate vocational education student progress from one level of training to another (secondary/postsecondary) and to employment--see note. (KC)

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Preface

Tests to measure vocational competencies provided in this booklet are designed to accompany the booklet Competencies for Articulation for Auto Mechanics. Test materials may be helpful to secondary and post-secondary administrators and staff in determining competencies developed by students and in determining appropriate levels of advanced placement for students.

These tests may be used as instruments to accurately assess the development of competencies or they may be used as examples of tests teachers may develop or select. When selecting or developing tests other than those provided in the booklet, it is important that the testing instruments and the methods of testing measure the task/s, using the conditions and limitations and the criteria for acceptable performance for each competency. Several competencies have no tests provided; information within the competency statements makes it possible for staff to select appropriate test materials.

TEST
for
COMPETENCY NO. 1

Task:

To analyze and service the components of the internal combustion engine.

A. Block and crankshaft assembly

Conditions and Limitations of the Test:

Given the conditions stated in competency #1, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Crankshaft
2. Crankshaft main bores and caps
3. Crankshaft main bearings
4. Camshaft bearings and bores
5. Flywheel
6. Harmonic damper

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Crankshaft main or connecting rod journals
   A. Excessive wear on journals
   B. Excessive out-of-round
   C. Excessive taper

2. Crankshaft main bore and caps
   A. Excessive out-of-round
   B. Excessive wear in bore
   C. Bad line bore of block

3. Crankshaft main bearings
   A. Excessive wear
   B. Installed improperly
   C. Bearing failure

4. Camshaft bearings and bores
   A. Excessive wear
   B. Physical damage
   C. Installed improperly

5. Flywheel
   A. Heat checking
   B. Warpage
   C. Ring gear wear or damage

6. Harmonic damper
   A. Worn sealing surface
   B. Physical damage
   C. Worn key-way

Criteria of Acceptable Performance:

The criteria stated in Competency #1 will be used to verify the satisfactory completion of written and performance tests.

TEST
for
COMPETENCY NO. 1

Task:

To analyze and service the components of the internal combustion engine.

B. Piston and cylinder assembly.

Conditions and Limitations of Test:

Given the conditions stated in competency #1, the student will complete a written and performance test

A. The written test will consist of the identification, operation, and function of the following components:

1. Pistons
2. Piston rings
3. Piston pins
4. Connecting rods
5. Connecting rod bearings
6. Cylinder bores

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Pistons
   - A. Worn ring grooves
   - B. Physical damage
   - C. Skirt wear

2. Piston rings
   - A. Worn ring face
   - B. Installed improperly
   - C. Physical damage

3. Piston pins
   - A. Worn pin diameter
   - B. Installed improperly
   - C. Physical damage

4. Connecting rods
   - A. Excessive parallel
   - B. Excessive twist
   - C. Worn piston pin bore

5. Connecting rod bearings
   - A. Excessive wear
   - B. Installed improperly
   - C. Failed bearings

6. Cylinder bores
   - A. Excessive wear in bore diameter
   - B. Excessive out-of-round
   - C. Excessive taper

Criteria of Acceptable Performance:

The criteria stated in Competency #1 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 1

Task:

To analyze and service the components of the internal combustion engine.

C. Valve train assembly

Conditions and Limitations of Test:

Given the conditions stated in competency #1, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Camshaft
2. Camshaft drive and thrust control
3. Camfollowers
4. Push rods
5. Rocker arms
6. Rocker arm supports
7. Valve rotators
8. Valve springs
9. Valve spring retainers and locks

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Camshaft
   A. Journal wear
   B. Lobe wear
   C. Cam run-out
2. Camshaft drive and thrust control
   A. Physical damage
   B. Improper installation
   C. Excessive wear
3. Cam followers (Hydraulic)
   A. Excessive wear
   B. Worn or damaged check valve
   C. Excessive clearance internally
4. Push rods
   A. Physical damage
   B. Excessive wear
   C. Oil inside rod
5. Rocker arms
   A. Excessive wear
   B. Physical damage
   C. Improper installation and adjustment
6. Rocker arm supports
   A. Excessive wear
   B. Physical damage
   C. Improper installation
7. Valve rotators
   A. Excessive wear
   B. Physical damage
   C. Installed improperly
8. Valve springs
   A. Spring not square
   B. Physical damage or wear
   C. Low spring tension
9. Spring retainers
   A. Excessive wear
   B. Physical damage

Criteria of Acceptable Performance:

The criteria stated in Competency #1 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 1

Task:

To analyze and service the components of the internal combustion engine.

D. Cylinder head assembly

Conditions and Limitations of Test:

Given the conditions stated in competency #1, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:
   1. Valves
   2. Valve seats
   3. Valve guides
   4. Valve seals
   5. Valve ports
   6. Cylinder head
   7. Gaskets and seals

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

   1. Valves
      A. Worn stems
      B. Physical damage
      C. Insufficient valve margin
   2. Valve seats
      A. Improper seat width
      B. Improper position (Valve face contact)
      C. Physical damage
   3. Valve guides
      A. Excessive guide bore wear
      B. Physical damage
      C. Improperly installed (Insert type)
   4. Valve seals
      A. Improperly installed
      B. Physical damage
      C. Excessive wear
   5. Valve ports
      A. Restrictions
      B. Physical damage
   6. Cylinder head
      A. Head warpage
      B. Cracks
      C. Physical damage
   7. Gaskets and seals
      A. Improperly installed
      B. Physical damage
      C. Excessive wear

Criteria of Acceptable Performance:

The criteria stated in Competency #1 will be used to verify the satisfactory completion of the written and performance test.

TEST
for
COMPETENCY NO. 2

Task:

To analyze and service the components of the engine lubrication system.

A. Oil pump

Conditions and Limitations of Test:

Given the conditions stated in competency #2, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Oil pump drive
2. Pressure regulating valve
3. Oil pick-up tube and screen
4. Gears, vanes, inner and outer rotor

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Oil pump drive
   A. Physical damage
   B. Excessive wear

2. Pressure regulating valve
   A. Spring weak or damaged
   B. Valve assembly worn or damaged
   C. Valve stuck open or closed

3. Oil pick-up tube and screen
   A. Plugged
   B. Misadjusted or damaged
   C. Crack or break above oil level

4. Gears, vanes, inner and outer rotor
   A. Physical damage
   B. Excessive wear
   C. Improperly installed

Criteria of Acceptable Performance:

The criteria stated in Competency #2 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 2

Task:

To analyze and service the components of the engine lubrication system.

B. Oil filters

Conditions and Limitations of the Test:

Given the conditions stated in competency #2, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Housing and container
2. By-pass valve
3. Gaskets and seals

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Housing and Container
   A. Physical damage
   B. Installed improperly

2. Bypass valve
   A. Spring weak or damaged
   B. Valve assembly worn or damaged
   C. Valve stuck open or closed

3. Gaskets and seals
   A. Improperly installed
   B. Physical damage
   C. Excessive wear

Criteria of Acceptable Performance:

The criteria stated in Competency #2 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 2

Task:

To analyze and service the components of the engine lubrication system.

C. Oil galleries and passages

Conditions and Limitations of Test:

Given the conditions stated in competency #2, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Main bearings
2. Camshaft bearings
3. Connecting rod bearings
4. Crankshaft
5. Head gasket
6. Oil galleries
7. Oil passages or gallery plugs
8. External supply line

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Main bearings
   A. Improperly installed
   B. Damaged bearings
   C. Worn bearings
2. Camshaft bearings
   A. Improperly installed
   B. Damaged bearings
   C. Worn bearings
3. Connecting rod bearings
   A. Improperly installed
   B. Damaged bearings
   C. Worn bearings
4. Crankshaft
   A. Damaged oil passages
   B. Restricted or plugged passages
5. Head gasket
   A. Physical damage
   B. Improperly installed
   C. Excessive wear
6. Oil Galleries
   A. Damaged
   B. Restricted or plugged
7. Oil passages or gallery plugs
   A. Physical damage
   B. Leaking
   C. Improperly installed
8. External supply line
   A. Physical damage
   B. Restricted or plugged
   C. Improperly installed

Criteria of Acceptable Performance:

The criteria stated in Competency #2 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 2

Task:

To analyze and service the components of the engine lubrication system.

D. Oil pressure indicators

Conditions and Limitations of Test:

Given the conditions stated in competency #2, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Bourdon tube gauge, capillary tube and bulb (vapor pressure)
2. Balancing coil sending unit & indicator
3. Thermostatic sending unit & indicator
4. Indicator light and sending unit

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Bourdon tube gauge, capillary tube and bulb
   A. Physical damage
   B. Loss of liquid from tube and bulb

2. Balancing coil sending unit and indicator
   A. Open, short, or ground in wiring
   B. Defective gauge
   C. Defective sending unit

3. Thermostatic sending unit & indicator
   A. Open, short, or ground in wiring
   B. Defective gauge
   C. Defective sending unit

4. Indicator light and sending unit
   A. Open, short, or ground in wiring
   B. Defective bulb
   C. Defective sending unit

Criteria of Acceptable Performance:

The criteria stated in Competency #2 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 2

Task:

To analyze and service the components of the engine lubrication system.

E. Oil coolers

Conditions and Limitations of Test:

Given the conditions stated in competency #2, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Fins or ribs
2. Tubes
3. Housing
4. Core

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Fins or ribs
   A. Physical damage

2. Tubes
   A. Physical damage
   B. Leakage
   C. Improper installation

3. Housing
   A. Physical damage
   B. Leakage
   C. Improper installation

4. Core
   A. Physical damage
   B. Leakage
   C. Improper installation

Criteria of Acceptable Performance:

The criteria stated in Competency #2 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 3

To analyze and service the components of the electrical system.

A. Ignition system—Conventional

Conditions and Limitations of Test:

Given the conditions stated in competency #3, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Battery
2. Ignition switch
3. Ignition coil
4. Distributor
5. Spark plugs
6. Ignition resister
7. Primary wiring
8. Secondary wiring

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Battery
   A. Physical damage
   B. Low electrolite level
   C. Discharged
   D. Sulfated
2. Ignition switch
   A. Physical damage
   B. Open
   C. Shorted
3. Ignition Coil
   A. Physical damage
   B. Open
   C. Grounded
4. Distributor
   A. Physical damage
   B. Excessive wear
   C. Misadjusted
5. Spark plugs
   A. Physical damage
   B. Excessive wear
   C. Misadjusted
6. Ignition resistor
   A. Physical damage
   B. Open
   C. Shorted
7. Primary wiring
   A. Open
   B. Shorts
   C. Connected incorrectly
8. Secondary wires
   A. Physical damage
   B. Open
   C. High resistance

Criteria of Acceptable Performance:

The criteria stated in Competency #3 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO.3

Task:

To analyze and service the components of the electrical system.

B. Ignition system—Electronic

Conditions and Limitations of Test:

Given the conditions stated in competency #3, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Battery
2. Ignition switch
3. Ignition coil
4. Distributor
5. Control unit
6. Spark plugs
7. Ignition resister
8. Primary wiring
9. Secondary wiring

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Battery
   - A. Physical damage
   - B. Low electrolite level
   - C. Discharged
   - D. Sulfated
2. Ignition switch
   - A. Physical damage
   - B. Open
   - C. Shorted
3. Ignition coil
   - A. Physical damage
   - B. Open
   - C. Grounded
4. Distributor
   - A. Physical damage
   - B. Excessive wear
   - C. Misadjustment
5. Control Unit
   - A. Physical damage
   - B. Non-functioning
6. Spark plugs
   - A. Physical damage
   - B. Excessive wear
   - C. Misadjusted
7. Ignition resistor
   - A. Physical damage
   - B. Open
   - C. Shorted
8. Primary wiring
   - A. Open
   - B. Shorted
   - C. Connected incorrectly
9. Secondary wiring
   - A. Physical damage
   - B. Open
   - C. High Resistance

Criteria of Acceptable Performance:

The criteria stated in Competency #3 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 3

Task:

To analyze and service the components of the electrical system.

C. Cranking system

Conditions and Limitations of Test:

Given the conditions stated in competency #3, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Battery
2. Starting switch
3. Magnetic switch
4. Solenoid switch
5. Cranking motor
6. Cranking motor drive
7. Neutral safety switch

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Battery
   - A. Physical damage
   - B. Low electrolite level
   - C. Discharged
   - D. Sulfated
2. Starting switch
   - A. Physical damage
   - B. Open
   - C. Shorted
3. Magnetic switch
   - A. Physical damage
   - B. Shorted or grounded winding
   - C. Open or high resistance in winding
4. Solenoid switch
   - A. Physical damage or wear
   - B. Misadjusted
   - C. Open, shorts, or grounds in winding
5. Cranking motor
   - A. Physical damage
   - B. Excessive wear
   - C. Open, shorts, or grounds
6. Cranking motor drive
   - A. Physical damage
   - B. Excessive wear
   - C. Misadjusted
7. Neutral safety switch
   - A. Physical damage
   - B. Open
   - C. Misadjusted

Criteria of Acceptable Performance

The criteria stated in Competency #3 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for

COMPETENCY NO. 3

Task:

To analyze and service the components of the electrical system.

D. Charging system

Conditions and Limitations of the Test:

Given the conditions stated in competency #3, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Battery
2. DC or AC generator
3. Regulator
4. Dash indicator
5. Wiring

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Battery
   A. Physical damage
   B. Low electrolite level
   C. Discharged
   D. Sulfated

2. DC or AC generator
   A. Physical damage or wear
   B. Open, shorts, or grounds
   C. Misadjustments

3. Regulator
   A. Physical damage or wear
   B. Open, shorts, or grounds
   C. Misadjustments

4. Dash indicator
   A. Physical damage
   B. Open in wiring
   C. Defective volt or ammeter

5. Wiring
   A. Open, shorts, or grounds
   B. Improperly connected
   C. Physical damage

Criteria of Acceptable Performance:

The criteria stated in Competency #3 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 3

Task:

To analyze and service the components of the electrical system.

E. Lighting

Conditions and Limitations of Test:

Given the conditions stated in competency #3, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Head, tail, and backup lights
2. Head and tail light switches
3. Dimmer switch
4. Backup light switch
5. Cornering lamps and side marker
6. License, underhood and trunk lamps

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Head, tail, and backup lights
   A. Bulbs defective
   B. Bulb housing defective
   C. Wiring to bulbs defective
2. Head and tail light switches
   A. Defective switch
   B. Wiring to switch is defective
3. Dimmer switch
   A. Defective switch
   B. Wiring to switch is defective
4. Backup light switch
   A. Defective switch
   B. Wiring to switch is defective
   C. Switch is misadjusted
5. Cornering lamps and side markers
   A. Defective bulbs
   B. Defective wiring to bulbs
   C. Bulb housing defective
6. License, underhood and trunk lamps
   A. Defective bulbs
   B. Defective wiring to bulbs
   C. Bulb housing defective

Criteria of Acceptable Performance:

The criteria stated in Competency #3 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 3

Task:

To analyze and service the components of the electrical system

F. Accessories

Conditions and Limitations of Test:

Given the conditions stated in competency #3, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Accessory components
2. Motors
3. Buzzers
4. Solenoids
5. Relays
6. Vacuum controls
7. Vacuum actuators

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Accessory components
   A. Defective component
   B. Open in electrical supply wiring
   C. Open fuse or breaker switch
2. Motors
   A. Physical damage
   B. Excessive wear
   C. Open, shorts, or grounds
3. Buzzers
   A. Physical damage
   B. Open, shorts, or grounds
   C. Excessive wear
4. Solenoids
   A. Physical damage
   B. Open, shorts, or grounds
   C. Misadjusted
5. Relays
   A. Physical damage
   B. Open, shorts, or grounds
   C. Misadjusted
6. Vacuum Controls
   A. Loss of vacuum supply
   B. Physical damage or wear
   C. Misadjusted
7. Vacuum actuators
   A. Loss of vacuum supply
   B. Physical damage or wear
   C. Misadjusted

Criteria of Acceptable Performance:

The criteria stated in Competency #3 will be used to verify the satisfactory completion of the written and performance tests.

TEST
For
COMPETENCY NO. 4

Task:

To analyze and service components of the fuel system.

A. Fuel supply system

Conditions and Limitations of Test:

Given the conditions stated in competency #4, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Fuel tank
2. Fuel cap
3. Fuel level indicator
4. Fuel pump
5. Fuel filter

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Fuel tank
   A. Physical damage
   B. Leakage
   C. Contaminated
2. Fuel cap (non vented)
   A. Physical damage
   B. Excessive wear
   C. Leakage
3. Fuel level indicator
   A. Physical damage
   B. Malfunction in gauge
   C. Malfunction in sender unit
4. Fuel pump
   A. Physical damage
   B. Excessive wear
   C. Leakage (vacuum and pressure)
5. Fuel filter
   A. Physical damage
   B. Improperly installed
   C. Plugged

Criteria of Acceptable Performance:

The criteria stated in Competency #4 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 4

Task:

To analyze and service components of the fuel system

B. Carburetor system

Conditions and Limitations of Test:

Given the conditions stated in competency #4, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Idle circuit
2. Accelerator pump circuit
3. Choke circuit
4. Float circuit
5. Main metering circuit
6. Power circuit

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Idle circuit
   A. Physical damage
   B. Plugged or restricted
   C. Misadjusted
2. Accelerator pump circuit
   A. Physical damage
   B. Plugged or restricted
   C. Misadjusted
3. Choke circuit
   A. Physical damage
   B. Plugged or restricted
   C. Misadjusted
4. Float circuit
   A. Physical damage
   B. Plugged or restricted
   C. Misadjusted
5. Main metering circuit
   A. Physical damage
   B. Plugged or restricted
   C. Misadjusted
6. Power circuit
   A. Physical damage
   B. Plugged or restricted
   C. Misadjusted

Criteria of Acceptable Performance:

The criteria stated in Competency #4 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 4

Task:

To analyze and service components of the fuel system.

C. Air cleaner system

Conditions and Limitations of Test:

Given the conditions stated in competency #4, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Filter element
2. Duct valve
3. Vacuum system

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Filter element
   A. Physical damage
   B. Plugged or restricted
   C. Incorrect installation

2. Duct valve
   A. Physical damage to valve
   B. Physical damage to actuator
   C. No vacuum

3. Vacuum system
   A. Vacuum control malfunctioning
   B. No vacuum

Criteria of Acceptable Performance:

The criteria stated in Competency #4 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 4

Task:

To analyze and service components of the fuel system.

D. Emission control system—Crankcase emission control system

Conditions and Limitations of Test:

Given the conditions stated in competency #4, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. PCV valve
2. Oil filler cap
3. Air inlet filter and hoses

B. The performance test will consist of checking all components for malfunctions, diagnosing, and correcting the malfunction. Possible malfunctions could include:

1. PCV valve
   A. Physical damage
   B. Plugged or restricted
   C. Improperly installed

2. Oil filler cap
   A. Physical damage
   B. Plugged or restricted
   C. Contaminated

3. Air inlet filter and hoses
   A. Physical damage
   B. Plugged or restricted
   C. Incorrectly installed

Criteria of Acceptable Performance:

The criteria stated in Competency #4 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 4

Task:

To analyze and service components of the fuel system.

D. Emission control system—Exhaust emission control system (modified)

Conditions and Limitations of Test:

Given the conditions stated in competency #4, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Carburetor
2. Heated air intake
3. Distributor
4. Intake manifold
5. Cylinder head

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Carburetor
   - A. Plugged or restricted
   - B. Excessive wear or damage
   - C. Misadjusted
2. Heated air intake
   - A. Physical damage
   - B. Plugged or restricted
   - C. Misadjusted
3. Distributor
   - A. Physical damage
   - B. Excessive wear
   - C. Misadjusted
4. Intake manifold
   - A. Physical damage
   - B. Plugged or restricted
   - C. Vacuum leaks
5. Cylinder head
   - A. Physical damage
   - B. Excessive wear
   - C. Misadjusted, damaged or plugged

Criteria of Acceptable Performance:

The criteria stated in Competency #4 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 4

Task:

To analyze and service components of the fuel system.

D. Emission Control System — Air Injection System

Conditions and Limitations of Test:

Given the conditions stated in competency #4, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:
   1. Air supply pump
   2. Air by pass valve
   3. Check valve
   4. Air distribution manifold

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

   1. Air Supply Pump
      A. Noisey
      B. Leaking
      C. Physical damage

   2. Air by-pass valve
      A. Leaking
      B. Physical damage
      C. Noisey

   3. Check valve
      A. Leaking
      B. Physical damage

   4. Air distribution manifold
      A. Leaking
      B. Plugged

Criteria of Acceptable Performance:

The criteria stated in Competency #4 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 4

Task:

To analyze and service components of the fuel system

E. Induction system

Conditions and Limitations of Test:

Given the conditions stated in competency #4, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Manifold heat riser
2. Crossover
3. PCV valve
4. Intake manifold

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Manifold heat riser
   A. Physical damage
   B. Worn or loose
   C. Plugged
2. Crossover
   A. Physical damage
   B. Plugged or restricted
3. PCV valve
   A. Physical damage
   B. Plugged or restricted
   C. Improperly installed
4. Intake manifold
   A. Physical damage
   B. Plugged or restricted
   C. Vacuum leaks

Criteria of Acceptable Performance:

The criteria stated in Competency #4 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 5

Task:

To analyze and service the components of the accessory system.

A. Heater system

Conditions and Limitations of Test:

Given the conditions stated in competency #5, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Heater motor
2. Heater controls
3. Heater core
4. Water control valve
5. Heater hoses

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Heater motor
   - A. Shorted
   - B. Open
   - C. Grounded
2. Heater controls
   - A. Electrical problems
   - B. Binding
   - C. Broken
3. Heater core
   - A. Leaking
   - B. Plugged
   - C. Dirty
4. Water control valve
   - A. Leaking
   - B. Stuck
   - C. Broken
5. Heater hose
   - A. Leaking
   - B. Cracked
   - C. Plugged

Criteria of Acceptable Performance:

The criteria stated in Competency #5 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 5

Task:

To analyze and service the components of the accessory system.

B. Air conditioning system

Conditions and Limitations of Test:

Given the conditions stated in competency #5, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Compressor
2. Compression clutch
3. Evaporator
4. Expansion valve
5. Condensor
6. Dryer
7. System controls
8. Compressor controls
9. Connecting hoses

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Compressor
   A. Noisy
   B. External leak
   C. Internal leak
2. Compression clutch
   A. Electrical problem
   B. Physical damage
   C. Slipping
3. Evaporator
   A. Leaking
   B. Internal restriction
   C. External restriction
4. Expansion valve
   A. Stuck open
   B. Stuck close
   C. Restricted
5. Condensor
   A. Leaking
   B. Internal restriction
   C. External restriction
6. Dryer
   A. Restricted
   B. Leaking
   C. Desiccant saturated
7. System controls
   A. Restricted
   B. Stuck close
   C. Stuck open
8. Compressor controls
   A. Electrical problems
   B. Leaking
   C. Adjustments
9. Connecting hoses
   A. Leaking
   B. Physical damage

Criteria of Acceptable Performance:

The criteria stated in Competency #5 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 5

Task:

To analyze and service the components of the accessory system.

C. Power seat system

Conditions and Limitations of Test:

Given the conditions stated in competency #5, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Selector switch
2. Motor
3. Wiring

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Selector switch
   A. Shorted
   B. Open
   C. Broken

2. Motor
   A. Open
   B. Shorted
   C. Excessive wear

3. Wiring
   A. Open connections
   B. Shorted connections
   C. Grounded

Criteria of Acceptable Performance:

The criteria stated in Competency #5 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 5

Task:

To analyze and service the components of the accessory system.

D. Cruise control system

Conditions and Limitations of Test:

Given the conditions stated in competency #5, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Switches
2. Control unit
3. Linkage
4. Governor

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Switches
   A. Burnt contacts
   B. Broken

2. Control unit
   A. Electrical problem
   B. Vaccum leak
   C. Mechanical problem

3. Linkage
   A. Worn
   B. Broken
   C. Adjustment

4. Governor
   a. Worn
   B. Broken

Criteria of Acceptable Performance:

The criteria stated in Competency #5 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 5

Task:

To analyze and service the components of the accessory system.

E. Power window system

Conditions and Limitations of Test:

Given the conditions stated in competency #5, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Motor
2. Switch
3. Master switch
4. Window guide

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Motor
   A. Open
   B. Shorted
   C. Excessive wear

2. Switch
   A. Burnt contacts
   B. Broken
   C. Open

3. Master switch
   A. Burnt contacts
   B. Broken
   C. Open

4. Window guide
   A. Worn
   B. Misadjusted
   C. Broken

Criteria of Acceptable Performance:

The criteria stated in Competency #5 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 6

Task:

To analyze and service the components of the cooling system.

A. Water pump

Conditions and Limitations of Test:

Given the conditions stated in competency #6, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Water pump housing
2. Impeller
3. Seals
4. Gaskets
5. Bearings
6. Pump drive

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Water pump housing
   A. Cracked or broken
   B. Warped
2. Impeller
   A. Loose
   B. Worn
   C. Broken
3. Seals
   A. Mechanical damage
   B. Leaking
   C. Hardened or cracked
4. Gaskets
   A. Broken
   B. Leaking
5. Bearing
   A. Excessive wear
   B. Rough or rusty
   C. Seized
6. Pump Drive
   A. Bent
   B. Worn
   C. Slipping belt

Criteria of Acceptable Performance:

The criteria stated in Competency #6 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 6

Task:

To analyze and service the components of the cooling system.

B. Radiator

Conditions and Limitations of Test:

Given the conditions stated in competency #6, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Inlet
2. Outlet
3. Filler cap
4. Neck
5. Drain cock
6. Core
7. Storage tanks
8. Tranmission oil cooler

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Inlet
   A. Leaking
   B. Mechanical damage
2. Outlet
   A. Leaking
   B. Mechanical damage
3. Filler cap
   A. Leaking (weak spring)
   B. Rusty
   C. Improper cap
4. Neck
   A. Leaking
   B. Mechanical damage
5. Drain cock
   A. Leaking
   B. Seized
   C. Mechanical damage
6. Core
   A. Leaking
   B. Restricted (internal)
   C. Restricted (external)
7. Storage tank
   A. Leaking
   B. Mechanical damage
8. Transmission oil cooler
   A. Leaking
   B. Collapsed line
   C. Stripped connection

Criteria of Acceptable Performance:

The criteria stated in Competency #6 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 6

Task:

Analyze and service the components of the cooling system.

C. Radiator cap

Conditions and Limitations of Test:

Given the conditions stated in competency #6, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Pressure valve
2. Vacuum valve
3. Cap lock

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Pressure valve
   A. Weak spring
   B. Seize
   C. Mechanical damage

2. Vacuum valve
   A. Seized closed

3. Cap lock
   A. Bent (mech. damage)
   B. Broken (mech. damage)

Criteria of Acceptable Performance:

The criteria stated in Competency #6 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 6

Task:

To analyze and service the components of the cooling system.

D. Fan

Conditions and Limitations of Test:

Given the conditions stated in competency #6, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Fan drive
2. Shroud
3. Blade
4. Fluid coupling

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Fan drive
   A. Improper tension
   B. Misaligned
   C. Sprung

2. Shroud
   A. Loose
   B. Broken
   C. Misaligned

3. Blade
   A. Out-of-balance
   B. Cracked blades
   C. Slipping Thermo-coupling

4. Fluid coupling
   A. Worn
   B. Broken
   C. Seized bearing

Criteria of Acceptable Performance:

The criteria stated in Competency #6 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 6

Task:

To analyze and service the components of the cooling system.

E. Coolant

Conditions and Limitations of Test:

Given the conditions stated in competency #6, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Coolant

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Coolant
   A. Contaminated
   B. Improper mixture
   C. Improper coolant

Criteria of Acceptable Performance:

The criteria stated in Competency #6 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 6

Task:

To analyze and service the components of the cooling system.

F. Connecting hoses.

Conditions and Limitations of Test:

Given the conditions stated in competency #6, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Hoses
2. Clamps
3. Connectors

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Hoses
   A. Decayed
   B. Leaking
   C. Improper mounting

2. Clamps
   A. Mechanical damage
   B. Weak, rusty

3. Connectors
   A. Mechanical damage
   B. Rusty (corroded)

Criteria of Acceptable Performance:

The criteria stated in Competency #6 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 6

Task:

To analyze and service the components of the cooling system.

G. Temperature indicators

Conditions and Limitations of Test:

Given the conditions stated in competency #6, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Dash indicator
2. Sending unit
3. Ignition switch

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Dash indicator
   A. Bulb out
   B. Disconnected
   C. Malfunctioning indicator

2. Sending unit
   A. Poor connection
   B. Malfunctioning

3. Ignition switch
   A. Poor connection
   B. Mechanical damage

Criteria of Acceptable Performance:

The criteria stated in Competency #6 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 6

Task:

To analyze and service the components of the cooling system.

H. Thermostat

Conditions and Limitations of Test:

Given the conditions stated in competency #6, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Thermostat

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Thermostat
   A. Stuck
   B. Upside down
   C. Wrong heat range

Criteria of Acceptable Performance:

The criteria stated in Competency #6 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 7

Task:

To analyze and service the components of the suspension system.

A. Front end suspension system

Conditions and Limitations of Test:

Given the conditions stated in competency #7, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Control arm bushings
2. Ball joint
3. Leaf spring
4. Shock absorbers
5. King pin
6. Coil spring

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Control arm bushings
   A. Deteriorated rubber
   B. Rusted or worn cross bar
   C. Crushed or broken control arm
2. Ball joint
   A. Excessive radial tolerance
   B. Excessive axial tolerance
   C. Torn or missing dust boot
3. Leaf spring
   A. Excessive sag
   B. Misaligned saddle
   C. Broken
4. Shock absorber
   A. Broken mounting bracket
   B. Deteriorated rubber bushing
   C. Leaking
5. King pin
   A. Excessive bushing wear
   B. Hard to steer
   C. Will not take grease
6. Coil spring
   A. Excessive sag
   B. Broken

Criteria of Acceptable Performance:

The criteria stated in Competency #7 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 7

Task:

To analyze and service the components of the suspension system.

B. Rear suspension system

Conditions and Limitations of Test:

Given the conditions stated in competency #7, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Rear spring
2. Stabilizer bushing
3. Rear axle housing
4. Rear axle bearing
5. Shock absorber

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Rear spring
   A. Broken spring
   B. Sagged spring
   C. Misaligned spring
2. Stablizer bushing
   A. Deteriorated rubber
   B. Cracked stabilizer
3. Rear axle housing
   A. Misaligned
   B. Axle bearing seat damage
4. Rear axle bearing
   A. Excessive wear
   B. Broken
   C. Seized
5. Shock absorber
   A. Broken mounting bracket
   B. Deteriorated rubber bushing
   C. Leakage

Criteria of Acceptable Performance:

The criteria stated in Competency #7 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 7

Task:

To analyze and service the components of the suspension system.

C. Steering system - manual

Conditions and Limitations of Test:

Given the conditions stated in competency #7, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Ball joint
2. Tie rod end
3. Idler arm
4. Drag link (relay rod)
5. Steering sector

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Ball joint
   A. Excessive radial tolerance
   B. Excessive axial tolerance
   C. Torn or missing dust boot
2. Tie rod end
   A. Excessive wear
   B. Torn dust boot
   C. Dry—lack of lubrication
3. Idler arm
   A. Excessive wear
   B. Dry—lack of lubricant
   C. Improperly installed
4. Drag link (relay rod)
   A. Excessive wear
   B. Bent
   C. Dry—lack of lubrication
5. Steering sector
   A. Excessive pitman shaft play
   B. Lack of lubricant
   C. Sector loose at frame, misadjusted

Criteria of Acceptable Performance:

The criteria stated in Competency #7 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 7

Task

To analyze and service the components of the suspension system.

D. Steering System Power

Conditions and Limitations of Test:

Given the conditions stated in competency #7, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Ball Joint
2. Hydraulic pump
3. Drag link
4. Drive belt
5. Steering sector
6. Pitman arm

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Ball Joint
   a. Excessive radial tolerance
   b. Excessive axial tolerance
   c. Torn or missing dust boot
2. Hydraulic pump
   a. Low fluid
   b. Leaking seal
   c. Mesh out of adjustment
3. Drag link (relay rod)
   a. Bent
   b. Excessive wear
   c. Dry — lack of lubricant
4. Drive belt
   a. Loose
   b. Worn
   c. Missing
5. Steering sector
   a. Excessive pitman shaft play
   b. Sector loose at frame
   c. Misadjusted
6. Pitman arm
   a. Bent
   b. Out of adjustment
   c. Loose

Criteria of Acceptable Performance:

The criteria stated in Competency #7 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 7

Task:

To analyze and service the components of the suspension system.

E. Front wheel alignment

Conditions and Limitations of Test:

Given the conditions stated in competency #7, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Camber
2. Caster
3. Toe-in
4. Steering axis inclination
5. Turning radius

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Camber
   A. Sagging suspension
   B. Bent parts
   C. Misadjustment
2. Caster
   A. Sagging springs
   B. Bent parts
   C. Worn parts
3. Toe-in
   A. Sagging springs
   B. Bent parts
   C. Worn parts
4. Steering axis inclination
   A. Bent, sagging parts
5. Turning radius
   A. Bent parts
   B. Worn parts

Criteria of Acceptable Performance:

The criteria stated in Competency #7 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 8

Task:

To analyze and service the components of the power train.

A. Friction clutch and pressure release bearing

Conditions and Limitations of Test:

Given the conditions stated in competency #8, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Flywheel assembly
2. Pressure plate assembly
3. Clutch disc
4. Bearings
5. Pedal and Linkage

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Flywheel assembly
   A. Heat cracks
   B. Wear and warpage
   C. Damaged or defective ring gear
2. Pressure plate assembly
   A. Weak springs
   B. Worn fingers
3. Clutch disc
   A. Lining
   B. Cushing springs (tension)
   C. Torsional springs (tension)
4. Bearings —release and pilot
   A. Type (bushing-bearing)
   B. Excessive wear
5. Pedal and linkage
   A. Free travel
   B. Assist spring
   C. Worn, bent or damaged parts
   D. Improper adjustment

Criteria of Acceptable Performance:

The criteria stated in Competency #8 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 8

Task:

To analyze and service the components of the power train.

B. Three and four speed transmissions

Conditions and Limitations of Test:

Given the conditions stated in competency #8, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Pinion shaft (input)
2. Pinion shaft bearing
3. Syncronizers
4. Low-reverse slider
5. Speedometer drive gear
6. Counter gear and shaft
7. Reverse idler
8. Shifting detents
9. Linkage
10. Anti-friction bearing
11. Lubricant

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Pinion shaft (input)
   A. Alignment
   B. Bent
   C. Cracked
2. Pinion shaft bearing
   A. Pitted
   B. Rough
   C. Physical damage
3. Syncronizers
   A. Cracked
   B. Worn
4. Low-reverse slider
   A. Broken
   B. Worn
5. Speedometer drive gear
   A. Broken teeth
   B. Leaking seal
   C. Worn teeth
6. Counter gear and shaft
   A. Worn
   B. Chipped teeth
   C. Physical damage
7. Reverse idler
   A. Worn
   B. Chipped teeth
   C. Physical damage
8. Shifting detents
   A. Worn
   B. Broken
9. Linkage
   A. Timing
   B. Wear and damage
   C. Bent
10. Anti-friction bearing
    A. Worn
    B. Physical damage
11. Lubrication
    A. Fill levels
    B. Weight
    C. Service

Criteria of Acceptable Performance:

The criteria stated in Competency #8 will be used to verify the satisfactory completion of the written and peformance tests.

TEST
for
COMPETENCY NO. 8

Task:

To analyze and service the components of the power train.

C. Drive shaft and universal joints

Conditions and Limitations of Test:

Given the conditions stated in competency #8, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components.

1. Universal joint
2. Drive shaft
3. Hanger
4. Bearing
5. Slip joint

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Universal joint
   A. Physical damage
   B. Lack of lubricant
   C. Excessive wear
2. Driveshaft
   A. Out-of-balance
   B. Excessive run out
   C. Canceling angle
3. Hanger
   A. Bent
   B. Loose
4. Bearing
   A. Physical damage
   B. Excessive wear
5. Slip joint
   A. Excessive wear
   B. Leaking
   C. Physical damage

Criteria of Acceptable Performance:

The criteria stated in Competency #8 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 8

Task:

To analyze and service the components of the power train.

D. Differential

Conditions and Limitations of Test:

Given the conditions stated in competency #8, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Pinion
2. Ring gear
3. Pinion bearing
4. Carrier bearing
5. Differential
6. Lubricant

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Pinion
   A. Excessive wear
   B. Adjustment
   C. Physical damage
2. Ring gear
   A. Excessive wear
   B. Adjustment
   C. Physical damage
3. Pinion bearing
   A. Excessive wear
   B. Pitted
   C. Physical damage
4. Carrier bearing
   A. Excessive wear
   B. Pitted
   C. Physical damage
5. Differential pinion gear
   A. Excessive wear
   B. Physical damage
   C. Adjustment
6. Lubricant
   A. Type
   B. Level
   C. Contaminated

Criteria of Acceptable Performance:

The criteria stated in Competency #8 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 8

Task:

To analyze and service the components of the power train.

E. Rear axle shaft and housing

Conditions and Limitations of Test:

Given the conditions stated in competency #8, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Axle seal
2. Axle bearing
3. Wheel lugs
4. Housing vent
5. Axle

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Axle seal
   A. Leaking
   B. Physical damage
2. Axle bearing
   A. Physical damage
   B. Excessive wear
3. Wheel lugs
   A. Stripped
   B. Broken
4. Housing vent
   A. Plugged
   B. Leaking
5. Axle
   A. Bent
   B. Excessive wear
   C. Physical damage

Criteria of Acceptable Performance:

The criteria stated in Competency #8 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 8

Task:

To analyze and service the components of the power train.

F. The overdrive system

Conditions and Limitations of Test:

Given the conditions stated in competency #8, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Planetary gears
2. Shifting solenoid
3. Shifting linkage
4. Governor
5. Lubricant

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Planetry gears
   A. Mesh
   B. Chipped
   C. Out of round
   D. Wear and damage
2. Shifting solenoid
   A. Broken spring
   B. Open circuit
   C. Reversed wires
3. Shifting linkage
   A. Timing
   B. Wear and damage
   C. Bent
4. Governor
   A. Bent shaft
   B. Bent weights
   C. Poor ground
5. Lubricant
   A. Fill level
   B. Weight
   C. Service

Criteria of Acceptable Performance:

The criteria stated in Competency #8 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 8

Task:

To analyze and service the components of the power train.

G. Automatic transmission

Conditions and Limitations of Test:

Given the conditions stated in competency #8, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Modulator valve
2. Torque convertor
3. Filter
4. Fluid
5. Vent tube
6. Seals

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1 Modulator valve
   A. Sticking
   B. Leaking
   C. Out of adjustment

2. Torque convertor
   A. Leaking
   B. Physical damage
   C. Wear

3. Filter
   A. Plugged

4. Fluid
   A. Dirty
   B. Burned

5. Vent tube
   A. Plugged
   B. Dented

6. Seals
   A. Leaking

Criteria of Acceptable Performance:

The criteria stated in Competency #8 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 9

Task:

To analyze and service the components of the brake system.

A. Drum brake system

Conditions and Limitations of Test:

Given the conditions stated in competency #9, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Brake drum
2. Wheel cylinder
3. Master cylinder
4. Brake shoes
5. Combination valve
6. Hydraulic lines
7. Fluid

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Brake drum
   - A. Mechanical damage
   - B. Out of round
   - C. Oversize
2. Wheel cylinder
   - A. Corroded
   - B. Leaking cups
   - C. Contaminated
3. Master Cylinder
   - A. Corroded or plugged
   - B. Leaking cups
   - C. Linkage out of adjustment
4. Brake shoes
   - A. Glazed
   - B. Too thin
   - C Oil soaked
5. Combination valve
   - A. Valve out of center
   - B. Stuck valve
   - C. Shorted switch
6. Hydraulic lines
   - A. Leaking brake hose
   - B. Mechanical damage
   - C. Loose connection
7. Fluid
   - A. Contaminated
   - B. Improper fluid

Criteria of Acceptable Performance:

The criteria stated in Competency #9 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 9

Task:

To analyze and service the components of the brake system.

B. Disc brake system

Conditions and Limitations of Test:

Given the conditions stated in competency #9, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Brake pad
2. Rotor
3. Master cylinder
4. Caliper
5. Combination Valve
6. Hydraulic lines
7. Fluid

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Brake pads
   A. Glazed
   B. Too thin
   C. Broken
2. Rotor
   A. Scored
   B. Too thin
   C. Warped
3. Master cylinder
   A. Corroded or plugged
   B. Damaged cups
   C. Leaking fittings
4. Caliper
   A. Stuck piston
   B. Leaking seal
   C. Mechanical damage
5. Combination valve
   A. Valve out of center
   B. Stuck valve
   C. Shorted switch
6. Hydraulic lines
   A. Leaking brake hose
   B. Mechanical damage
   C. Loose connection
7. Fluid
   A. Contaminated
   B. Improper fluid

Criteria of Acceptable Performance:

The criteria stated in Competency #9 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 9

Task:

To analyze and service the components of the brake system.

C. Power brake system

Conditions and Limitations of Test:

Given the conditions stated in competency #9, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Power unit
2. Master cylinder
3. Vacuum system
4. Brake lines
5. Fluid

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Power unit
   - A. Leaking diaphragm
   - B. Mechanical damage
   - C. Linkage problem
2. Master cylinder
   - A. Corroded or plugged
   - B. Damaged cups
   - C. Mechanical damage
3. Vacuum system
   - A. Disconnected hose
   - B Leaking hose
   - C. Damaged check valve
4. Brake line
   - A. Leaking brake hose
   - B. Mechanical damage
   - C. Loose connec ion
5. Fluid
   - A. Contaminated
   - B. Improper fluid

Criteria of Acceptable Performance:

The criteria stated in Competency #9 will be used to verify the satisfactory completion of the written and performance tests.

TEST
for
COMPETENCY NO. 10

Task:

To analyze and service the components of the exhaust system.

Conditions and Limitations of Test:

Given the conditions stated in competency #10, the student will complete a written and performance test.

A. The written test will consist of the identification, operation, and function of the following components:

1. Exhaust heat control valve
2. Gasket
3. Exhaust pipe (Y-pipe on V/8)
4. Muffler
5. Tail pipe
6. Resonator
7. Manifold
8. Catalytic converter
9. Fastening devices

B. The performance test will consist of checking all components for malfunctions, diagnosing and correcting the malfunction. Possible malfunctions could include:

1. Exhaust heat control valve
   A. Worn shaft
   B. Stuck or dragging
   C. Broken spring
2. Gasket
   A. Missing
   B. Leaking
   C. Improper gasket
3. Exhaust pipe (Y-pipe on V/8)
   A. Leaking
   B. Mechanical damage
   C. Restricted
4. Muffler
   A. Leaking
   B. Mechanical damage
   C. Restricted
5. Tail pipe
   A. Leaking
   B. Mechanical damage
   C. Rubbing on vehicle
6. Resonator
   A. Leaking
   B. Mechanical damage
   C. Improper connection
7. Manifold
   A. Cracked
   B. Warped
8. Catalytic Converter
   A. Leaking
   B. Mechanical damage
   C. Contaminated
9. Fastening devices
   A. Broken
   B. Worn
   C. Missing

Criteria of Acceptable Performance:

The criteria stated in Competency #10 will be used to verify the satisfactory completion of the written and performance tests.